



# Client Enrichment Series

Welcome to today's presentation on:  
*Energy and Conservation Standards*  
the presentation will start at 10 AM PDT

**Note:** Phones are automatically muted during the presentation. You have the ability to send questions to the host and presenters through the chat feature. They will answer as many of the questions as possible at the end of the presentation. All questions will be captured, and answers sent to all participants within 2 weeks.



# **Client Enrichment Series**

## ***Energy and Conservation Standards***

Hosted by: Kate Betz, Regional Account Manager,  
GSA Northwest Arctic Region

Presented by: Mark Ewing, Director, Energy Division,  
GSA National Office  
and Stephen Hochman, Energy Division,  
GSA National Office



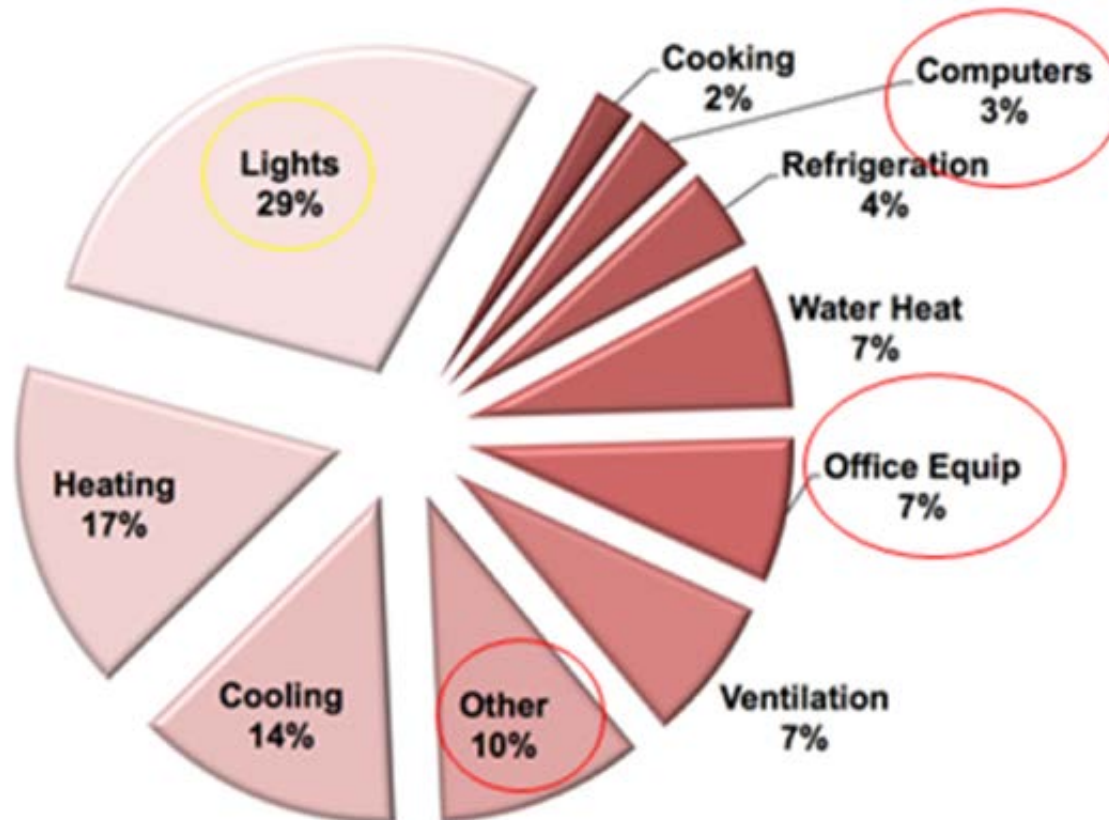
**GSA Public Buildings Service**

# BACKGROUND

- Commercial buildings in the U.S. accounted for about 20% of total U.S. energy use in 2010
- These buildings have the fastest energy growth rate in the U.S. of any end-use sector (other sectors: residential, transportation, & industry).



# Commercial Buildings Energy Use



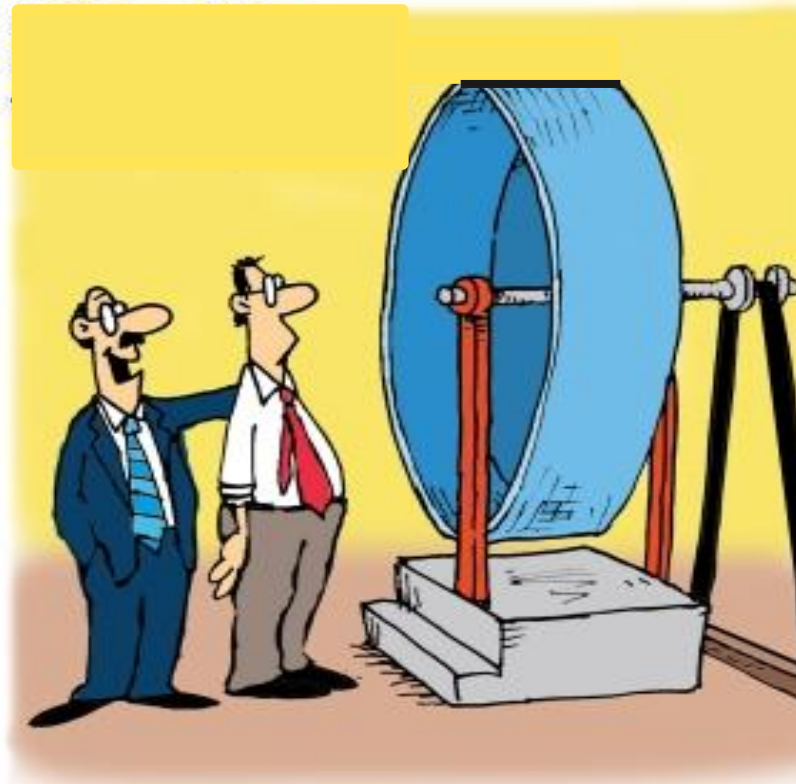
# EPACT 2005...NECPA...EISA 2007...Executive Order 13514.....Oh My!!!

## The Energy Independence & Security Act (EISA) addresses:

- Energy Reduction Goals for Federal Buildings
- Facility Management/Benchmarking
- Performance & Standards for New Building and Major Renovations
- High-Performance Buildings
- Energy Savings Performance Contracts
- Metering
- Other requirements



# Energy in the Future?



"THIS COULD SAVE US A BUNDLE ON ELECTRICITY . . . BY THE WAY, BOB, HOW FAST CAN YOU RUN?"

# Energy Reduction Goals for Federal Buildings

Reduce energy consumption (**per gross square foot**) in fiscal years 2006 through 2015.....

.....as compared with the energy consumption (**per gross square foot**) in fiscal year 2003, as follows:

Fiscal Year	Percentage Reduction
2006	2
2007	4
2008	9
2009	12
2010	15
2011	18
2012	21
2013	24
2014	27
2015	30

# So what are we doing?

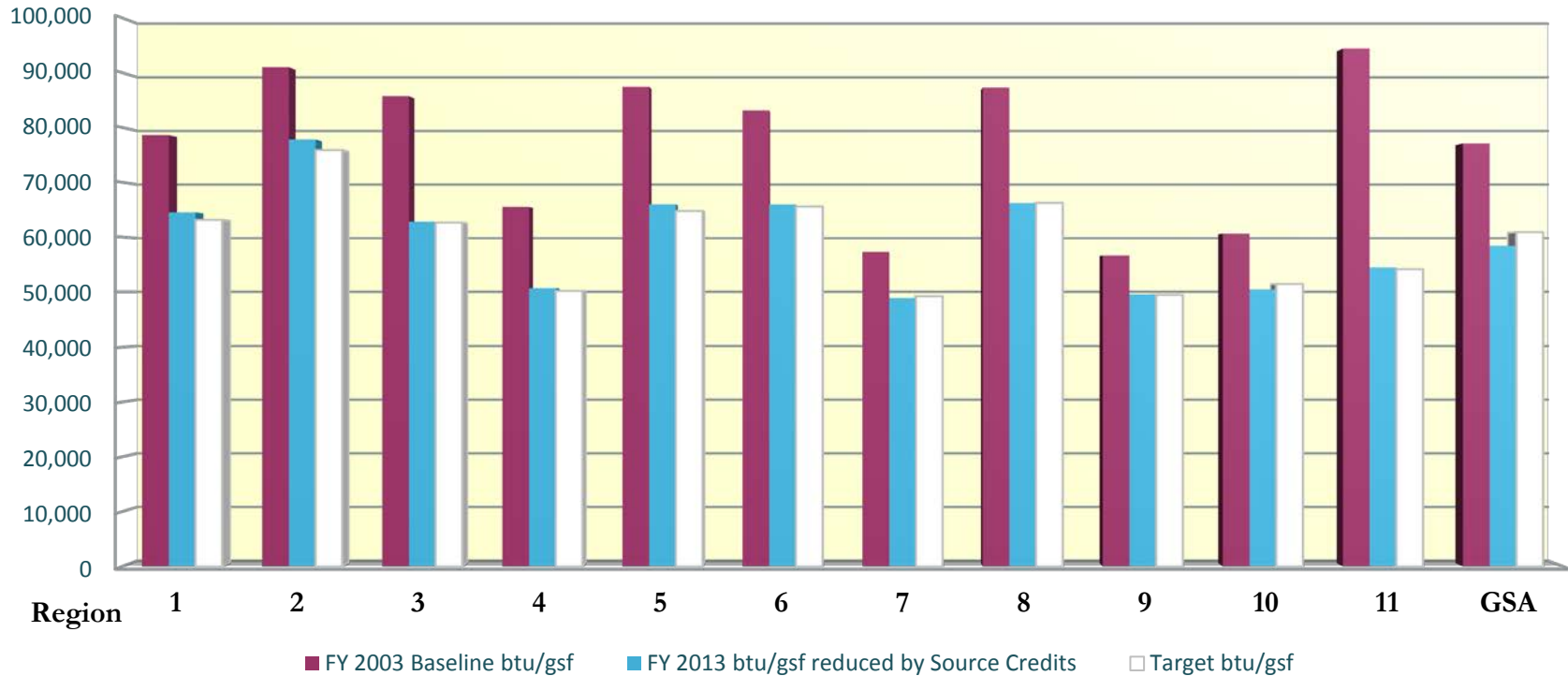
- GSA is installing advanced electricity meters in all “Covered Facilities” and all buildings where a Recovery Act project is occurring
- Expanding advanced metering program to measure natural gas and steam usage by FY 2016
- Separately metering cooling tower water usage where cost-effective
- 278 facilities have successfully completed advanced metering and additional 156 nearing completion - this equates to 80% of agency’s electricity consumption being monitored with advanced metering



# GSA Energy Performance

Energy Independence and Security Act of 2007  
FY 2013 Compared to FY 2003

BTU/Sq ft



Region	1	2	3	4	5	6	7	8	9	10	11	GSA
<sup>1</sup> FY 2013 btu/gsf	64,693	79,895	62,807	50,663	65,981	65,957	48,838	66,199	50,460	50,438	77,696	62,235
% change from baseline	-17.93%	-14.49%	-26.72%	-22.66%	-24.53%	-20.62%	-14.74%	-24.15%	-12.52%	-16.81%	-42.30%	-24.24%

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glasbergen.com



**“Because my generation cares about the planet!”**

# Energy Usage and Analysis System



# EUAS

# Energy Usage and Analysis System (EUAS)

- GSA's database of energy and water usage in all buildings where GSA pays utility bills
- EUAS database is the backbone from which all GSA energy, sustainability and greenhouse gas reports originate
- EUAS shares data with:
  - GSA's Carbon Footprint and Green Procurement Tool
  - Asset Business Plans
  - RWA Energy and Tracking Application
  - FEMP's EISA Sec. 432 Compliance Tracking System
  - Data.Gov
  - EPA Energy Star Portfolio Manager

# EUAS

## Energy Status Report

[? HELP](#)

### Summary Type :

Region :

State :

District :

### Scope by Building Categories :

A-STANDARD OWNED INVENTORY  
B-EXEMPT OWNED INVENTORY  
C-STANDARD ACTIVE LEASES  
D-EXEMPT LEASES  
E-REIMBURSABLE BUILDINGS  
F-NOT USED  
I-ENERGY INTENSIVE

Hold Ctrl key for selecting multiple categories.  
For category descriptions, please see help.

### Optional Building Designations :

This selection is optional and will return ONLY data for buildings with special designations.

-- Select --  
All Optional Designations  
W-EISA 2007 Covered Facility  
X-Recovery Act Project

Hold Ctrl key for selecting multiple designations.

### Current Reporting Period :

#### Reporting Period :

#### Month :

#### Fiscal Year :

#### Show Detail :

### Comparison Reporting Period :

#### Reporting Period :

#### Month :

#### Fiscal Year :

#### Conversion Detail :

# EUAS

## Actual Data Report - Energy

Building Summary for building categories : ALL

Energy Usage is shown in Actual units - Show All Report Details

Report for the period of Fiscal Year 2008

Date : 5/26/2009

Time : 9:03:35 AM

Region :	07	Building Category :	A Building : TX0224ZZ
Building Name :	FRITZ G LANHAM FB	City :	FORT WORTH
Field Office :	W0F1-FORT WORTH SERVICE CENTER	State :	Texas
District :	WESTERN SERVICE CENTER	GSF :	767,042

		Electricity (KWH)	RenElec (KWH)	Demand (KW)	Steam (MLB)	Gas (Cubic Ft)	RenGas (Cubic Ft)	Oil (Gallon)	Coal (Ton)	Chill. Wtr (Ton Hr)
Oct	Usage	1,037,467 N	0	0	0	339,000 N	0	0	0	0
	Cost	\$95,995 N	\$0	\$0	\$0	\$3,640 N	\$0	\$0	\$0	\$0
Nov	Usage	953,728 N	0	0	0	764,800 N	0	0	0	0
	Cost	\$87,256 N	\$0	\$0	\$0	\$8,038 N	\$0	\$0	\$0	\$0
Dec	Usage	1,051,141 N	0	0	0	1,803,300 N	0	0	0	0
	Cost	\$95,224 N	\$0	\$0	\$0	\$16,757 N	\$0	\$0	\$0	\$0
Jan	Usage	882,172 N	0	0	0	2,049,800 N	0	0	0	0
	Cost	\$82,560 N	\$0	\$0	\$0	\$18,798 N	\$0	\$0	\$0	\$0
Feb	Usage	933,843 N	0	0	0	893,100 N	0	0	0	0
	Cost	\$87,800 N	\$0	\$0	\$0	\$7,546 N	\$0	\$0	\$0	\$0
Mar	Usage	913,369 N	0	0	0	903,800 N	0	0	0	0
	Cost	\$85,513 N	\$0	\$0	\$0	\$9,705 N	\$0	\$0	\$0	\$0
Apr	Usage	915,715 N	0	0	0	454,200 N	0	0	0	0
	Cost	\$86,188 N	\$0	\$0	\$0	\$4,852 N	\$0	\$0	\$0	\$0
May	Usage	1,055,810 N	0	0	0	158,000 N	0	0	0	0
	Cost	\$97,276 N	\$0	\$0	\$0	\$2,042 N	\$0	\$0	\$0	\$0
Jun	Usage	1,095,718 N	0	0	0	144,400 N	0	0	0	0
	Cost	\$100,633 N	\$0	\$0	\$0	\$2,202 N	\$0	\$0	\$0	\$0
Jul	Usage	1,120,057 N	0	0	0	117,900 N	0	0	0	0
	Cost	\$102,585 N	\$0	\$0	\$0	\$1,832 N	\$0	\$0	\$0	\$0
Aug	Usage	1,302,291 N	0	0	0	132,300 N	0	0	0	0
	Cost	\$112,633 N	\$0	\$0	\$0	\$1,649 N	\$0	\$0	\$0	\$0
Sep	Usage	1,067,138 N	0	0	0	39,600 N	0	0	0	0
	Cost	\$116,256 N	\$0	\$0	\$0	\$464 N	\$0	\$0	\$0	\$0
Total	Usage	12,328,449	0	0	0	7,800,200	0	0	0	0
	Cost	\$1,149,919	\$0	\$0	\$0	\$77,525	\$0	\$0	\$0	\$0





# Advanced Meters



# Use of Metering Data (Bldg Perspective)

## Energy billing & procurement

- Verifying utility bills
- Tenant energy use (sub metering)
- Identifying best rates
- Participating in demand response programs

## Optimize performance

- Diagnose equipment & systems operations
- Benchmark utility use
- ID potential projects
- ID power quality problems

Verify project  
performance

Promote energy  
awareness

## Demand Response Programs

- Monitor actions when response needed
- Measure results
- ID potential projects

# Use of Metering Data (Agency – Enterprise View)

## Energy Procurement

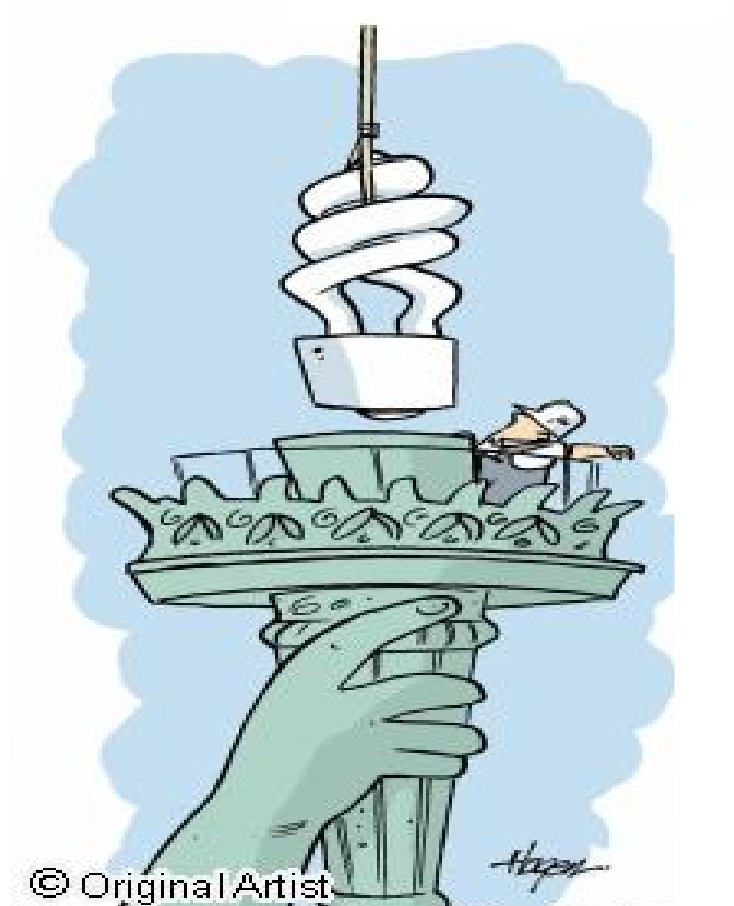
- Load Aggregation
- Load Factor
- Participating in demand response programs

## Benchmarking

- Baseline comparisons
- Start-Up Comparisons
- Energy/Water intensity
- Trends across similar bldg types

Verification for  
Reporting Mandates

Promote energy  
awareness  
& Sharing Lessons  
Learned



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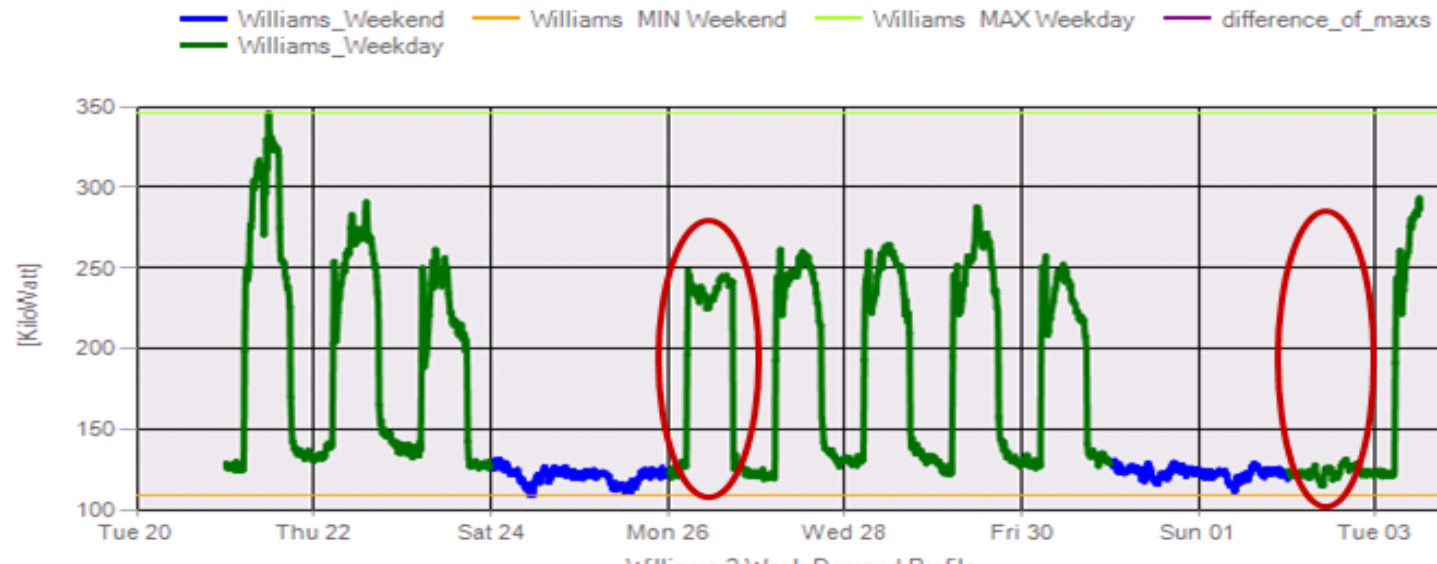
# How can Metering Improve my Bldg's Operation and Efficiency?

- Identify anomalies in usage patterns (Water leaks, equipment not shutting down)
- Start up and shut down schedules not matching desired sched
- Overtime Utility usage
- Baseloading info – comparison to similar sites
- Observe load curtailment events
- Watch impact on consumption by adjusting schedules
- Report Subscriptions (Trends Emailed to O&M Contractor or Others)

Williams\_2WeekDemandProfile (Read-Only)

Chart

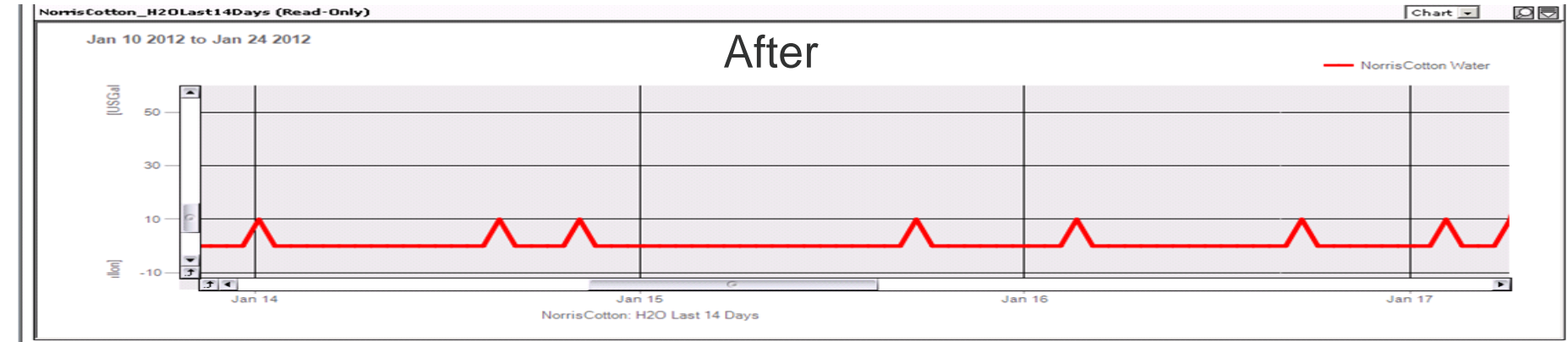
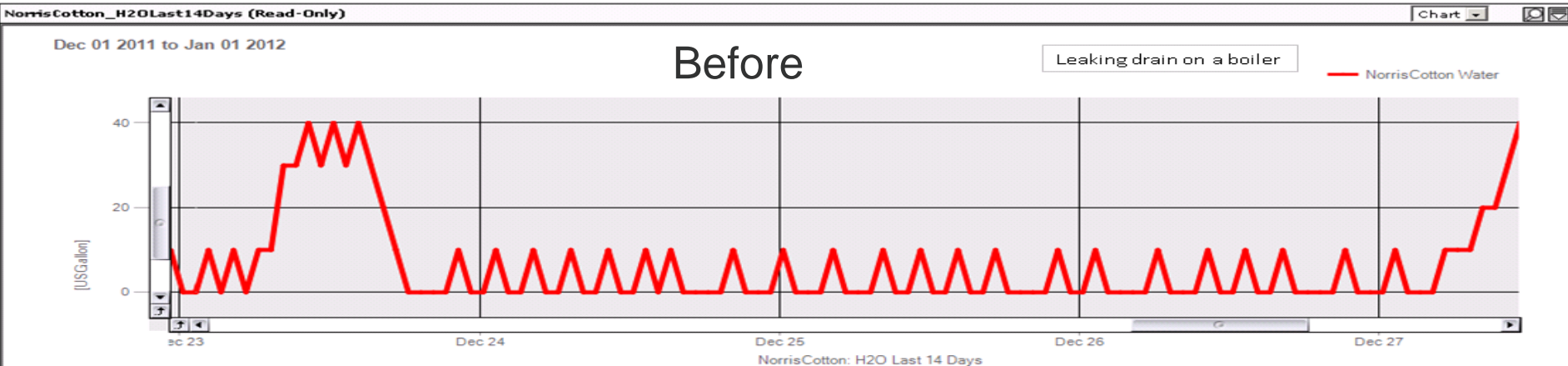
Dec 20 2011 to Jan 04 2012



- Noticed did not observe a holiday setback for 12/26/2011 and notified Mechanical Contractor
- Holidays were not programmed into the BAS
- Corrected programming for January 1st



Property mgr at Cotton FB (NH) suspected water leak when he saw these 10 gallon spikes. Leak was found to be a leaking drain on boiler.



www.CartoonStock.com



*RON MORGAN*



"We don't have energy-efficient appliances but the food in the 'fridge has gone green."



# Rapid Building Energy Assessments

New Carrollton Federal Building - [06/01/10 - 05/31/11]

PDF Report

Summary

Whole Building Analysis

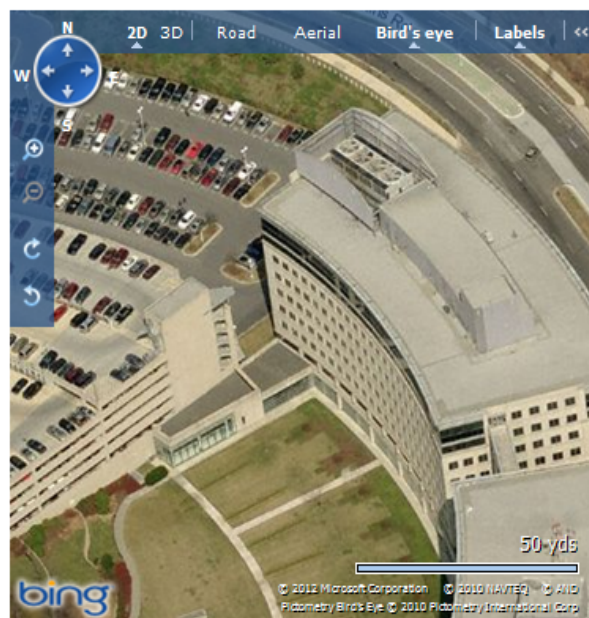
End Use Analysis

Recommendations

kBTU

On

Off



**Building Name:** New Carrollton Federal Building  
**Building Address:** 5000 Elin Road, Lanham, MD, 20706  
**Building Size(SqFt):** 1,007,000 GSF  
**Primary Activity:** Government Office  
**Heating Type:** Electricity  
**Cooling Type:** Electricity  
**Average Occupancy(%):** 100  
**Year Constructed:** 1997  
**Last Renovated:** N/A  
**Electricity Cost:** \$4,742,982 at average cost/kWh of 10 cents

Energy Consumption	Total	Per SqFt	Per SqFt (kBTU)
Electricity	47,429,818 kWh	47.10 kWh	160.71 kBTU
Total	161,830,541 kBTU	160.71 kBTU	160.71 kBTU
Peak Demand (Electric)	10,122 kW	10.05 W	34.32 BTU/hr

# First Fuel Analytics

New Carrollton Federal Building - FirstFuel - Windows Internet Explorer provided by General Services Administration

http://gsa.firstfuel.com/buildings/65/dashboard

File Edit View Favorites Tools Help

★ Favorites ☆ How to Caramelize Onions, ...

New Carrollton Federal B... x https://sharepoint.pbs.gsa....

Page Safety Tools ? >>

Open in new window

Observations

Savings Potential

Energy

Cost

Carbon

?

Electricity

15,550,000 kWh (33%)

\$1,555,000

7,019 tonnes

Total

53,056,600 kBtu

\$1,555,000

7,019 tonnes

Annual Electric End Use per SqFt

?

Cooling



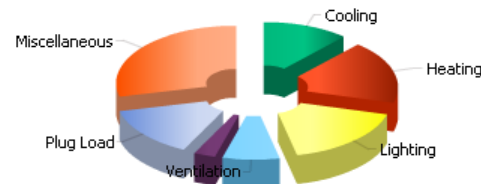
Lighting



Plug Load



Heating



Ventilation



Pumps



Miscellaneous - Electric



Analysis

Top Recommendations

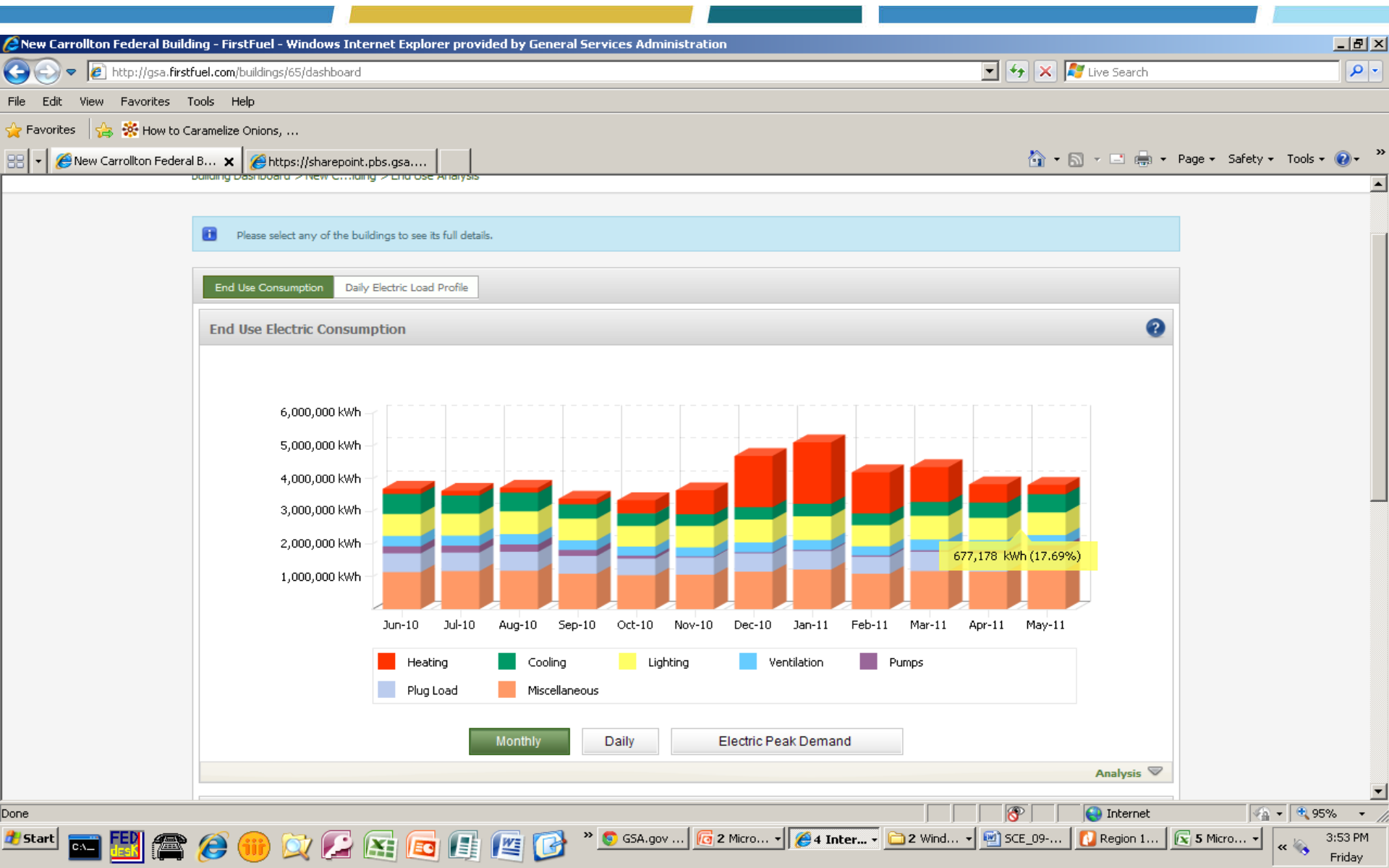
Done



GSA.go... Microso... 2 Int... 2 Win... Docum... SCE\_0... Microso... Excel H...

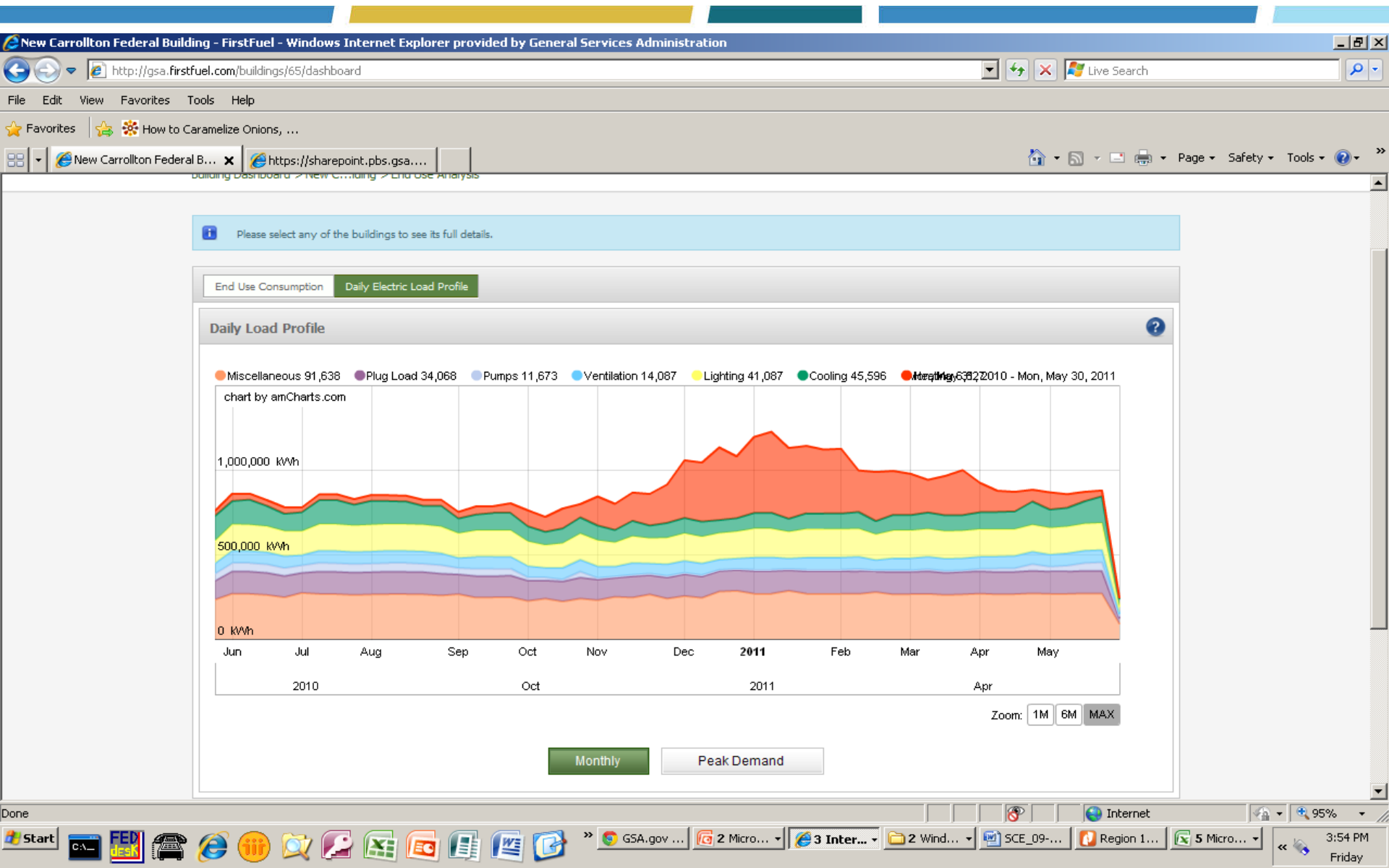
11:27 AM Friday

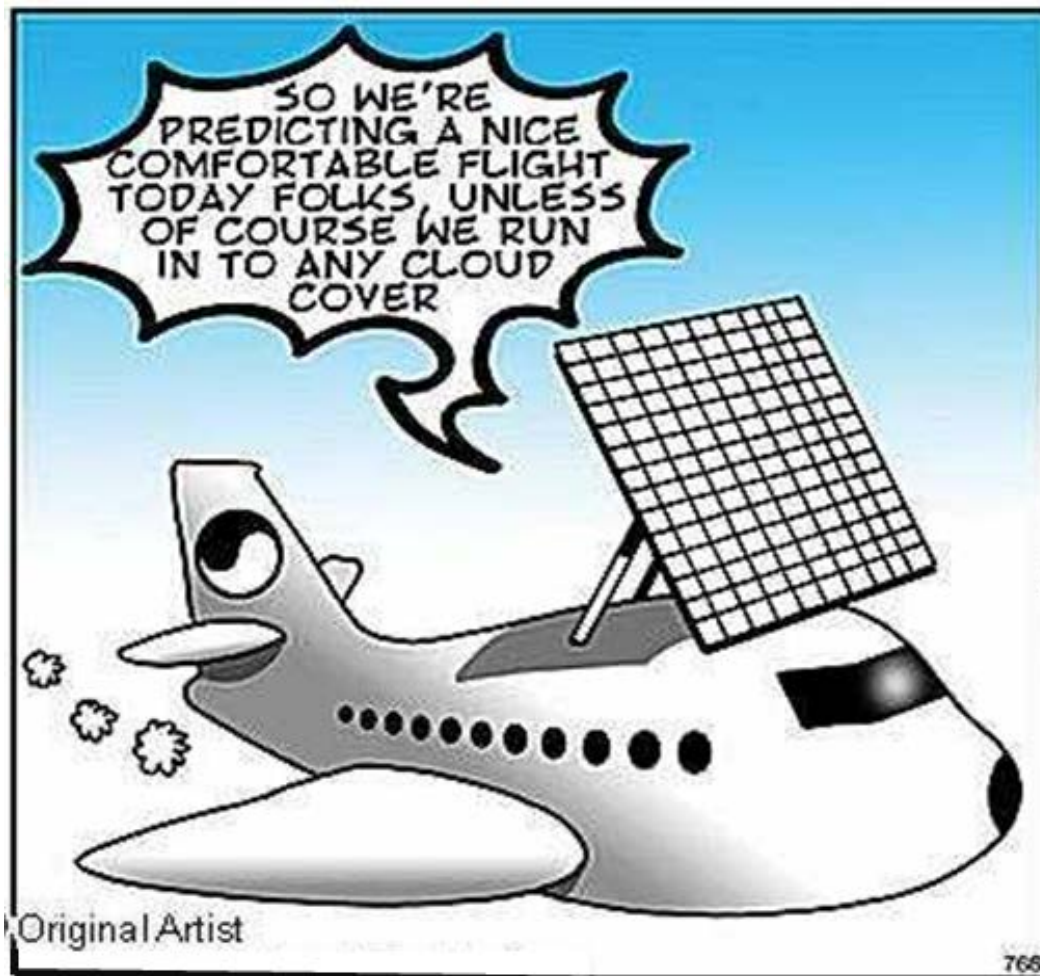
# First Fuel Analytics





# First Fuel Analytics





# Wayne Aspinall Federal Building and Courthouse

THEN...



...And NOW



# working together to achieve net zero

“...The Wayne N. Aspinall Federal Building and U.S. Courthouse has the potential to become:

- **The first net zero office building** for every agency housed at the federal building.
- **The first net zero building** listed on the National Register of Historic Places.
- **The first LEED Platinum building** in the nation for almost every one of the nine agencies...

...You will play a crucial role in making all of these incredible goals a reality... “

*Excerpted from tenant guidebook*



# get involved

- **Net Zero Advocates:** The building manager will be able to answer questions for you; you can also enlist an office member to be a Net Zero Advocate. Allow this person to help others by reminding them to turn lights and equipment off when not in use, answer questions about the devices in your space, and rally your team to reduce your use.
- **Friendly competition:** Let's face it, this building is small and we know everyone who works here. The interactive energy dashboard located in the lobby has a screen devoted to energy use by agency. The dashboard will show each agency's energy use based on square feet of office so the playing field has been leveled. Let's see who can use the least amount of energy each month!
- **Be innovative:** A goal of net zero has never been accomplished before in a federal office building or a building on the National Register of Historic Places. This is the time for innovation.

*Excerpted from tenant guidebook*



# Purchasing

*Decisions regarding the equipment you purchase for your space can help reduce energy loads in the building*

- **Buy energy efficient equipment:** Look for Energy Star®/EPEAT equipment (Energy Star copiers are 40% more efficient, run cooler, and last longer).
- **Choose a laptop instead of a desktop:** Laptops can save up to 90% in electricity use compared to desktop computers.
- **Upgrade CRT monitors to LCD:** Save energy by buying a flat screen monitor for your desktop. An LCD monitor uses roughly 40% less power than a CRT.
- **Replace old refrigerators and microwaves:** New refrigerators on average use about half of the energy of models sold from 1990. Personal refrigerators, coffee makers and microwaves are not allowed in areas that are not designated as kitchens or kitchenettes.

*Excerpted from tenant guidebook*

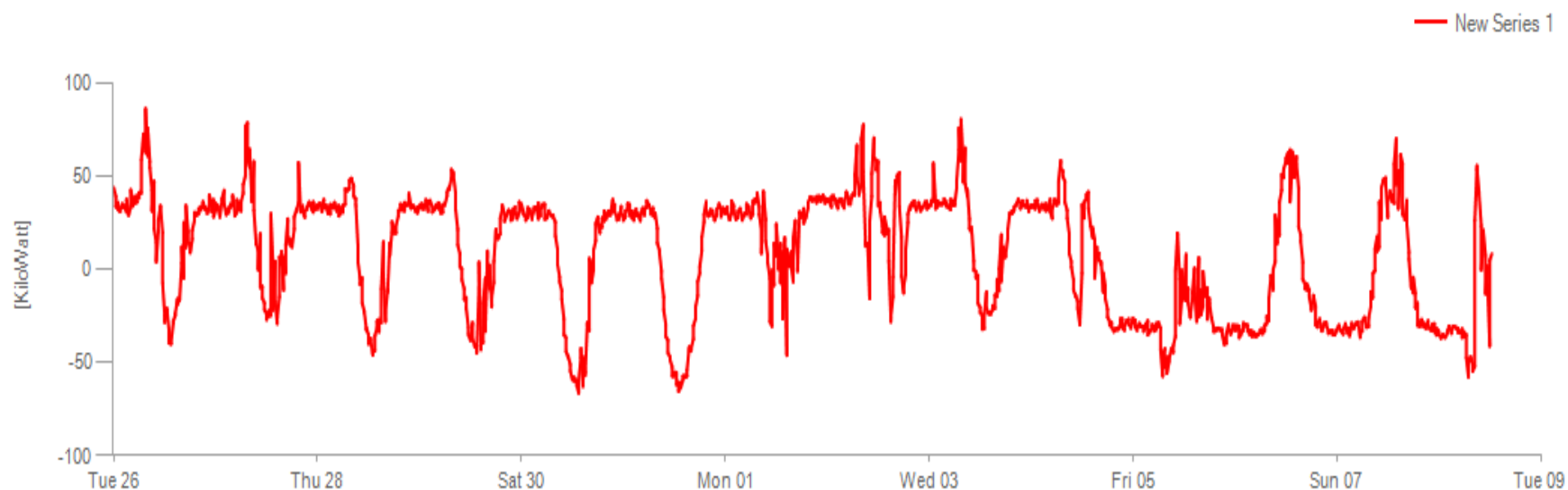


Untitled

Chart



Mar 26 2013 to Apr 09 2013



Add Data Group

Update Chart

# Standby power

*“Vampire energy” or “phantom power” is the energy used by some electronic devices that are turned off but still plugged into an outlet. This energy accounts for more than 100 billion kilowatt hours of annual U.S. electricity consumption.*

- **Unplug:** Simply **unplug items you don’t use very often.**
- **Use a smart plug strip:** As described in the previous section, **efficient use of the smart plug strips will combat standby power draw.**

*Excerpted from tenant guidebook*

# Lighting

*Almost 16% of the building's energy use will come from our overhead lighting. The lighting throughout the building is a combination of LED and high efficient fluorescent. Some of these lights will be dimmed according to the amount of daylight in your space and/or occupancy. We can continue to drive down lighting energy use by doing the following:*

- **Turn off lights when you do not need them:** If you enjoy natural daylight and the glow from your computer, you can manually turn off overhead lights by use of the switches on the wall.
- **Use task lighting:** You can turn off overhead lights and utilize desk lamps equipped with CFL or LED bulbs. Because of our daylight capability on the overhead lights, use of both task lighting and overhead lights will result in larger energy draws. To be truly efficient, make a decision to use one or the other.

*Excerpted from tenant guidebook*

# Thermal comfort

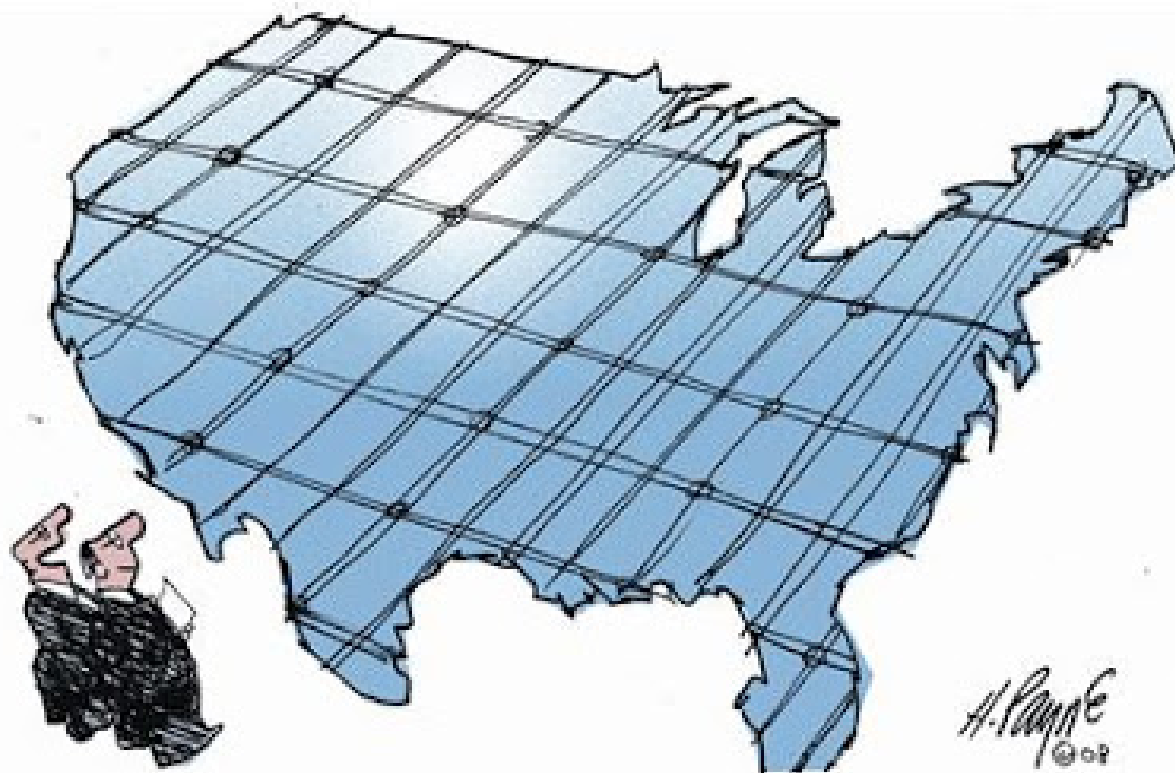
*Saving energy doesn't have to mean sacrificing comfort. There are a variety of ways to ensure that you are comfortable within your space.*

- **Use sunlight wisely:** Block direct sunlight by drawing the roller shades at your windows. In colder weather, leave the shades open on sunny days and draw the shades at night to help reduce heat loss.
- **Dress for the season:** If your org's dress code allows, wear weather appropriate clothing such as short sleeve dress shirts in the summer and a sweater in the winter.
- **Feel the breeze:** Although large fans are not allowed in spaces by GSA's "fire safety guidance for appliances", small desktop fans can be plugged into a shedding receptacle on your plug strip. Many of these desktop fans are battery or solar powered.
- **Control your space:** The zoned mechanical system is run on thermostats located within your space. You will be able to adjust the temperature on those devices within three degrees of the set point. The mechanical system is set on a time schedule and occupancy. If you work late or on a weekend, that unit will turn on and stay on as long as you are working in that area.

# Engage Building Occupants in Saving Energy



*While a large part of the energy used in a building is determined by the building's characteristics and systems, the behavior of the occupants also has a significant impact*



comics.com EMAIL: hpayne@detnews.com

"WE FINALLY INSTALLED ENOUGH SOLAR CAPACITY TO REPLACE OUR COAL DEPENDENCY... HAD TO MOVE THE ENTIRE U.S. POPULATION TO CANADA, THOUGH."

# Engage Building Occupants in Saving Energy



Occupancy schedules, usage patterns, behaviors and attitudes of the occupants, and the appliances and equipment used by the people in the building can decrease energy usage and costs

In commercial buildings, plug and process loads—the equipment and appliances that are plugged into electrical outlets—typically account for 30-35 percent of the total electricity used and are one of the largest and fastest-growing electric end uses in the United States



*Source: BOMA*

# Engage Building Occupants in Saving Energy



Usage intensity varies depending on occupant behavior, such as how often people turn off their computers or use the printers. however, a well-structured occupant engagement process can identify significant energy savings opportunities

Some studies have shown that simply informing occupants of their current energy usage can reduce energy consumption by 10-15 percent. Programs to further engage occupants can achieve even greater savings



# Questions?